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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/599,440	06/22/2000	Masato Shimada	Q59177	7701

7590

03/05/2003

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EXAMINER

BOSWELL, ALAN M

ART UNIT PAPER NUMBER

3729

DATE MAILED: 03/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/599,440

Applicant(s)

SHIMADA ET AL.

Examiner

Alan M Boswell

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 June 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8-12 and 17-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-12 and 17-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 6/22/00 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 08/756,254.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2,5,6
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Drawings

1. Figures 20 and 21 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 8,9,11,12 17-23 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No. 5581861 to Lee.

Regarding claim 8, Lee discloses forming a plurality of channels 26 in one side of a silicon mono-crystalline substrate (32, 56a and 56b); forming an oscillating plate film 48 on the bottom of each channel 26; forming a piezoelectric film 44 sandwich between upper and lower electrodes, on the oscillating plate film 48; and forming pressuring chambers 66 and 22 in the opposite of silicon mono-crystalline substrate (32

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56a and 56b) so as to be opposite to the channels 26, respectively (see col. 5, lines 40-65).

Regarding claim 9, Lee teaches a piezoelectric thin-film element 44 comprising forming the lower electrode 46b; forming the piezoelectric film 44 on the lower electrode 46b; forming the upper electrode 42b on the piezoelectric film 44; removing a portion of the upper electrode 42b to make an effective wide of the electrode narrower than a width of the pressuring chamber 66 (see Fig. 12 and col. 4, lines 47-60).

Regarding claim 11, Lee teaches forming a pattern of etching mask material 38 which acts as a mask 38 to an etching substance 40, in the areas of the upper electrode 42b which are desired to leave; and etching away the area of the upper electrode 42b that are not cover with the etching mask material 38 (see Figs. 6 and 7 and cols. 4 and 5, lines 47-60 and lines 1-27 respectively).

Regarding claim 12, Lee teaches removing a portion of the upper electrode by irradiating the area of the upper electrode 42b desired to remove using a laser beam (see col. 4, lines 47-60 and Fig. 12).

Regarding claims 17 and 18, Lee teaches making a recess 26 and 24 formation including the steps of partitioning the silicon mono-crystalline substrate 32 into unit areas to be used in forming the pressurizing chamber substrate 32, and forming a recess 26 and 24 in the side of the pressurizing chamber substrate 32 in which the pressuring chambers 66 are to be formed while leaving a peripheral area 70 along the circumference of the unit area; and further forming a recess 74 in the area where the pressurizing chambers 66 are formed in the pressurizing chamber 66 formation step,

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and making the thickness of the peripheral area 70 of the pressuring chamber substrate 56a greater than the height of the side wall for separating the pressurizing chambers from each other (see Fig 12).

Regarding claims 19-23, Lee teaches making recess 26 and 24 including a partitioning the silicon mono-crystalline substrate 32 into unit area to be used in forming the pressuring chamber substrate 32, and forming a recess 26 and 24 in the side of the pressurizing chamber substrate 32 opposite to the side on which the pressurizing chambers 66 are formed in each unit area 26 and 24, while leaving a peripheral area 70 along the circumference of the unit area, wherein the mechanical strength of the silicon mono-crystalline substrate 56a is maintained by increasing the thickness of the pressurizing chamber substrate 58 in the peripheral area 70 than the thickness of the pressurizing chamber substrate 58 in the recess 74 (see Fig 12).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of US Patent No. 5359760 to Busse.

Lee teaches the above limitations and a piezoelectric transducer but fails

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to forming a piezoelectric film precursor to a heat treatment in an oxygen so as to change the piezoelectric film precursor to the piezoelectric film.

Busse teaches forming a piezoelectric film precursor 16 to a heat treatment in an oxygen so as to change the piezoelectric film precursor 16 to the piezoelectric film 20 (see cols. 3 and 4, lines 46-67 and 1-2 respectively) for the purpose of producing an effective method of connection of individual conductors to the individual piezoelectric element.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the steps of forming the piezoelectric film in light of the teaching of Busse for the purpose of producing an effective method of connection of individual conductors to the individual piezoelectric element.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following is cited to show the state of the art in the method of manufacturing an ink-jet printing head.

US Patent No. 6056392 to Matsumoto.

7. Telephone inquiries regarding the status of applications or other general questions, by persons entitled to the information, should be directed to the group clerical personnel. In as much as the official records and applications are located in the clerical

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section of the examining groups, the clerical personnel can readily provide status information. M.P.E.P. 203.08. The Group clerical receptionist number is (703) 308-1148.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan M Boswell whose telephone number is (703) 305-0308. The examiner can normally be reached on M-F (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter D. Vo can be reached on (703) 308-1789. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3579 for regular communications and (703) 305-3579 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-2572.

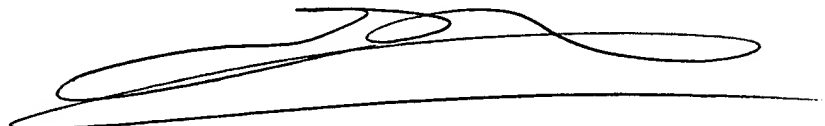
Other helpful telephone numbers are listed for applicant's benefit.

Allowed Files & Publication	(703) 308-6789 or (888) 786-0101
Assignment Branch	(703) 308-9723
Certificates of Correction	(703) 305-8309
Drawing Corrections/Draftsman	(703) 305-8404/8335
Petitions/Special Programs	(703) 305-9285
Terminal Disclaimers	(703) 305-8408
PCT Help Desk	(703) 305-3257

If the information desired is not provided above, or a number has been changed, please call the general information help line below.

Information Help line	1-800-786-9199
Internet PTO-Home Page	http://www.uspto.gov

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February 24, 2003



PETER VO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700